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EXAMINER

TESKIN, FRED M

ART UNIT PAPER NUMBER

1713

DATE MAILED: 11/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/756,386	Applicant(s) CABIOCH ET AL.	
	Examiner Fred M. Teskin	Art Unit 1713	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 September 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 and 29-39 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 15, 19-22 and 25 is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-11, 13, 14, 16-18, 23, 26, 27, 29, 30, 34 and 36-38 is/are rejected.
- 7) ☒ Claim(s) 6, 12, 24, 31-33, 35 and 39 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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This Office action is responsive to the Reply of September 1, 2006. Claims 1-27 and 29-39 are currently pending and under examination.

The objection under Rule 75(c) and rejection under Section 112 of the prior Office action have been obviated by appropriate amendments to claims 8, 25 and 36. The prior art rejection over Halasa has been obviated by the amendment of claim 1 to recite a minimum number-average molecular weight of 50,000 g/mol. The prior art rejection over Halasa et al has been obviated by the amendments restricting claims 27 and 30 to a catalytic system wherein the (polar agent:initiator) molar ratio range is greater than or equal to 10.

The indicated allowability of claims 2, 3, 8-12, 13, 14, 16-18, 26 and 29 is withdrawn in view of the newly discovered reference(s) to Hsu et al and Hellermann et al. Rejections based on the newly cited reference(s) follow.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 27, 30 and 36-38 stand rejected under 35 U.S.C. 103(a) as being unpatentable over US 4316820 to Wieder et al.

Wieder et al disclose a catalyst comprising (a) an organometallic compound of formula RMe where R represents a saturated aliphatic or aromatic hydrocarbon radical

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of 2 to 8 carbon atoms and Me is an alkali metal; (b) a compound of formula R'OMe' where R' represents a saturated aliphatic or aromatic hydrocarbon radical of 2 to 8 carbon atoms and Me' is an alkali metal; and (c) a tertiary aliphatic triamine (col. 2, ll.5-16). In particular, Wieder et al exemplify (Example 1) a catalyst that meets the compositional limitations of claims 27, 30 and 36 but for a polar agent : Initiator molar ratio being less than 8, e.g., 1:1 as in Example I(g).

However, Wieder et al express preference for a molar ratio of components (a) and (c) defined by a range of 0.1:1 to 10:1 (col. 2, ll. 49-52). The lower endpoint of 0.1:1 equates to a 1:10 ratio of (a) to (c) and thus would have suggested the suitability of a molar ratio of polar agent to organolithium initiator within the claimed range. Given this expressed preference, one of ordinary skill would have been led to modify the patentees' catalyst by adjusting the relative proportions of tertiary aliphatic triamine to organolithium compound therein to obtain a molar ratio equal to 10, and thereby produce a catalytic system within claims 27, 30 and 36.

As to new claims 37 and 38, Wieder et al list "pentyl" (i.e., amyl) as a preferred choice for R and R' of the described catalyst components (a) and (b), see column 2, lines 38-41. The listing of "pentyl" in this context would fairly imply the suitability of that alkyl group in any of its isomeric forms, including tert.-amyl. Further, given the close structural relationship between tert-amyl and the t-butyl isomer also mentioned as a preferred choice for R and R', there would have been a reasonable expectation of alkali metal alcoholates based on the former possessing similar properties to the corresponding t-butoxide salts, including similar activity in the patentees' catalyst. Such

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expectation of similar performance would have led one of ordinary skill to utilize an alkali metal tert-amylate such as sodium tert-amylate as component (b) of the patentees' catalyst together with a tertiary aliphatic triamine and an organolithium compound in proportions equating to a molar ratio of 10, as claimed.

Accordingly, the subject matter of claims 27, 30 and 36-38 would have been *prima facie* obvious to one having ordinary skill in the art at the time of applicants' invention.

Applicants' arguments filed September 1, 2006 have been fully considered, but are not persuasive of error in the repeated rejection.

With respect to Weider et al, it is argued that the reference "actually teaches away from the ratios claimed by Applicants," based on the patentees' identification of a range of from 0.5:1 to 5:1 (a/c) as most preferable and the description in the working examples of molar ratios of polar agent to initiator substantially below the minimum of 10 now specified in claim 30.

Examiner disagrees. While the minimum value claimed falls outside the *most* preferable range of the reference and while its working examples employ substantially lower values, the fact remains that this claimed value corresponds to the lower endpoint (0.1:1) of the a/c range taught by Wiedner et al as preferable and, further, the patentees do not disparage or otherwise discourage the use of a molar ratio of 0.1:1 a/c, or 10:1 c/a. *Cf., In re Peterson*, 65 USPQ2d 1379, 1384 (Fed. Cir. 2003). In fact, a molar ratio of (a) to (c) of *from 0.1:1 to 10:1* is part of the invention *claimed* by Wiedner et al (see col.

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6, ll. 1-11). It is not seen how one can plausibly argue that this reference “teaches away” from a catalyst composition that is an embodiment of its own claimed invention.

Examiner therefore maintains that Wieder et al do not teach away from applicants’ minimum (polar agent: initiator) molar ratio as recited in claims 27 and 30.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 27 and 34 are rejected under 35 U.S.C. 102(b) as being anticipated by either of US 4894425 (Hellermann et al) and US 5336739 (Hsu et al).

The applied references each describe catalyst systems comprising species of applicants’ “organolithium initiator” and “polar agent” as claimed, in molar ratios equal to 10. See Hellermann et al, Experiments 2, 4, 6 and 8 (Table, cols. 5-6). In the cited experiments, note that (1) the catalyst was n-butyllithium, (2) the various cocatalysts tested were specific *di*ether compounds and (3) the cocatalyst/catalyst ratio reported in the Table is a *molar* ratio as per column 4, lines 31-33. See also Hsu et al, Examples 11, 16, 21, 33, 34 and 39, each of which describes a catalyst system comprising certain alkyl tetrahydrofurfuryl ether modifiers in combination with n-butyl lithium initiator. As disclosed (e.g., col. 6, lines 40+), the modifier structure includes two ether linkages and therefore qualifies as a “polar agent comprising two or more heteroatoms,” as claimed.

Concerning the statement of intended utility in the preamble of claim 27 (i.e., "usable for producing ... linear diene elastomer"), this recitation has not been given patentable weight because it merely states the purpose or intended use of a catalytic system, and the body of the each claim does not depend on the preamble for completeness but, instead, the recited compositional limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 88 USPQ 478, 481 (CCPA 1951).

Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu et al.

Hsu et al differs from claim 29 only in that its specific embodiments employ a modifier to n-butyllithium molar ratio of 10, rather than 15, the minimum value claimed (see any of the above-cited working examples). However, the patentees recognize modifier concentration as a result effective parameter affecting vinyl content of the polymer being synthesized. See column 7, lines 1-10. Given the teaching of (1) using *large quantities* of the modifier if polymers having a very high vinyl content are desired and (2) modifier quantities of about 0.25 to *about 15 moles* per mole of metal in the organometallic initiator as being employed in most cases, one of ordinary skill desirous of maximizing vinyl content would have been well motivated to utilize the Hsu et al modifier in an amount such that a molar ratio at the upper end of the disclosed range is achieved. To this end, it would have been obvious to one of ordinary skill in the art at the time of applicants' invention to modify Hsu et al by increasing the molar ratio of

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modifier to n-butyllithium from 10 to 15, as claimed, with a reasonable expectation of obtaining a catalyst system capable of successfully synthesizing rubbery polymer of very high vinyl content.

Claims 1-5, 7-11, 13, 14, 16-18, 23, 26 and 29 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Hellermann et al.

Hellermann et al disclose a process for the preparation of polyisoprenes having high contents of vinyl microstructure (1,2- and 3,4-structural units) using alkyllithium compounds as catalyst and ethylene glycol dialkyl ethers of defined formula as cocatalyst (see col. 3, lines 15+). The described catalyst and cocatalyst correspond respectively to applicants' "initiator" and "polar agent" as claimed, and in various examples are used at a molar ratio 10 (i.e., cocatalyst/catalyst; see Examples 2, 4, 6, 8). Except for molar ratio value, essentially all of the cocatalyst/catalyst combinations disclosed by Hellermann et al fall within the recitations of claim 29. With respect to molar ratio, the patentees state, "[t]he cocatalyst is used in a ratio of 2:1 to 30:1, in particular 2:1 to 15:1, based on the number of moles of the catalyst." (Col. 4, ll. 32-34.)

The explicit disclosure of a molar ratio of 15:1 and 30:1 for a cocatalyst and catalyst identical in composition to applicants' initiator and polar agent, respectively, represents a specific disclosure of a discrete embodiment of the subject matter disclosed by Hellermann et al and, thus, an anticipation of claim 29. It has long been held that the disclosure in the prior art of any value within a claimed range is an

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anticipation of the claimed range. See, *Ex parte Lee*, 31USPQ2d 1105 (BPAI 1993) and *In re Wertheim*, 191 USPQ 90, 100 (CCPA 1976).

Alternatively, practicing the process of Hellermann et al at a cocatalyst/catalyst ratio within claim 29, e.g., 30:1, would have been obvious to one of ordinary skill given the disclosed ratio ranges noted above coupled with the patentees' teaching that, at higher temperatures, "larger amounts of cocatalyst are generally required in order to achieve the desired regulation of the microstructure." (Col. 4, ll. 34-36.) As higher temperatures are generally recognized to accelerate the polymerization reaction, ample incentive exists for operating at the upper end of the temperature range disclosed and achieving the desired polymer microstructure through use of larger amounts of the cocatalyst consistent with the patentees' teachings.

As to claims 1-5, 7-11,13, 14, 16-18 and 23, the recited parameters relating to mass content of cyclic vinyl units and number-average molecular weight are not mentioned in Hellermann et al. These properties, however, are the result of polymerizing at least one conjugated diene monomer according to the claimed process. The patentees exemplify polyisoprenes prepared by substantially the same process, i.e., by anionically polymerizing isoprene using a dialkyl ether cocatalyst and alkyl lithium catalyst at a molar ratio (10) within claims 13, 14, 16 and 17, the reaction being carried out batchwise (as in working Examples 2, 4, 6 and 8) or continuously (as per col. 4, ll. 57-60). In addition, the use of higher cocatalyst/catalyst ratios within claim 18 is specifically contemplated (e.g., 15:1 or 30:1 as per col. 4, ll. 31-33).

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Where, as here, the claimed and prior art products are identical or substantially identical, or are produced by identical or substantially identical processes, a *prima facie* case of either anticipation or obviousness is established. *In re Best*, 195 USPQ 430, 433 (CCPA 1977). When there is sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not. *In re Spada*, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

Further as to claims 7-11 as well as claim 26: the patentees' experimental procedure includes the step of reacting the rubber with a coupling agent (divinyl benzene) to provide a stellate structure that is said to be distinguishable from the uncoupled rubber by a substantially higher molecular weight (see col. 6, ll. 20-23 and 29-32). As claim 26 calls for the same reaction (i.e., reacting polymerization product with a coupling or starring agent), there is a plausible basis for inferring that the patentees' coupled rubber inherently meets the "branched" limitation of these claims.

Claims 6, 12, 24, 31-33, 35 and 39 are objected to as being dependent on a rejected base claim but would be allowable if rewritten in independent form including all the limitations of the base claim and any intervening claim.

Claims 15, 19-22 and 25 are allowable over the prior art of record.

The following is a statement of reasons for the indication of allowable subject matter: With respect to independent claim 15 (and claims dependent thereon), the

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limitation to anionic polymerization of at least one conjugated diene monomer by a continuous reaction with a catalytic system comprising an organolithium initiator, a polar agent comprising two or more heteroatoms, and an alkali metal salt of an aliphatic or alicyclic alcohol, such that said system simultaneously satisfies the stated conditions (i), (ii) and (iii), is not taught nor fairly suggested in any prior art documents located or identified by the examiner as of the date of this Office action.


In view of the new grounds of rejection not necessitated by applicants' amendment, this action is made non-final.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner F. M. Teskin whose telephone number is (571) 272-1116. The examiner can normally be reached on Monday through Thursday from 7:00 AM - 4:30 PM, and can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached on (571) 272-1114. The appropriate fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

FMTeskin/11-21-06


FRED TESKIN
PRIMARY EXAMINER
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